IN THE CLAIMS

1. (Currently Amended) A transient dilution air control arrangement for controlling a dilution air supply to an inlet of a partial flow dilution tunnel of a gas sampling system, the partial flow dilution tunnel being connected to an exhaust gas stream of an internal combustion engine, the gas sampling system having a first mass flow controller operatively connected to an inlet of the transient dilution air control arrangement, a second mass flow controller connected to an outlet end of the partial flow dilution tunnel and a filter interposed the second mass flow controller and the outlet end of the partial flow dilution tunnel, said transient dilution air control arrangement comprising:

a constant mass flow stream;

a variable mass flow stream; and

wherein said variable mass flow stream is non-collinearly connected with said constant mass flow stream prior to the inlet of the partial flow dilution tunnel.

2. (Previously Presented) The transient dilution air control arrangement of claim 1, wherein said constant mass flow stream includes a pressure regulating valve serially connected with a critical flow venturi.

3. (Previously Presented) The transient dilution air control arrangement of claim 1, wherein said variable mass flow stream is connected in parallel with said constant mass flow stream.

4. (Previously Presented) The transient dilution air control arrangement of claim 3, wherein said variable mass flow stream includes a first pressure regulating valve serially connected with a dome loaded regulating valve and a mass flow transducer.

5. (Previously Presented) The transient dilution air control arrangement of claim 4, wherein said variable mass flow stream includes a pressure regulating valve serially connected to a voltage to pressure controller.

6. (Previously Presented) The transient dilution air control arrangement of claim 5, wherein said voltage to pressure controller is connected to and receives electrical inputs from a flow measuring device and said mass flow transducer, said flow measuring device being adapted to measure a flow of intake air to the engine.

7. (Previously Presented) The transient dilution air control arrangement of claim 6, wherein said voltage to pressure controller is connected to and sends pressure signals to said dome loaded pressure regulating valve.

8. (Previously Presented) The transient dilution air control arrangement of claim 7, wherein an output from said dome loaded pressure regulating valve and said constant mass flow stream supply dilution air to said partial flow dilution tunnel.

9. (Previously Presented) The transient dilution air control arrangement of claim 1, including a flow measuring device adapted to measure a flow of intake air, said flow measuring device being positioned in a conduit of an air intake of the engine.

10. (Previously Presented) The transient dilution air control arrangement of claim 9, wherein said flow measuring device is a laminar flow element being connected to a pressure differential transducer.

11. (Previously Presented) The transient dilution air control arrangement of claim 10, wherein said pressure differential transducer is connected to a selectable gain circuit.

12. (Previously Presented) The transient dilution air control arrangement of claim 11, wherein said selectable gain circuit is switchable to handle one of a single channel input and a multiple channel input.

13. (Previously Presented) The transient dilution air control arrangement of claim 12, wherein said selectable gain circuit is selectable between a plurality of course settings.

14 – 52 (Cancelled)